

Comparison of Class III Phosphorus Concentrations with the Long-term Levels for the Refuge

Technical Oversight Committee
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Gary Goforth, P.E., Ph.D.



Objective

- The Everglades Consent Decree requires that the TOC make a determination of whether the Florida “Class III total phosphorus concentration levels are lower than the long term total phosphorus concentration levels” (Appendix B page B-4)
- To assist the TOC with this determination, calculations of the long-term total phosphorus (TP) levels given in Appendix B were compared to the Class III phosphorus water quality standard for the Everglades Protection Area (Rule 62-302.540, F.A.C.) for Water Years 1999-2006.

Method (page 1 of 2)

1. Daily stages for 1-7, 1-8C and 1-9 were obtained from DBHydro.
2. The stage data were averaged and evaluated against minimum (15.42 ft NGVD) and maximum (17.14 ft NGVD) thresholds as described in App. B.
 1. Days with the 3-gage average of less than 15.42 ft NGVD were eliminated
 2. Averages greater than 17.14 ft were assigned a value of 17.14 ft
3. The long-term TP level was calculated using equation in Appendix B.
4. Monthly average TP levels were computed.

Method (page 2 of 2)

5. Annual geometric mean TP concentrations were then calculated by computing the geometric mean of the 12 monthly average TP levels.
6. Since the Class III standard contains a 5-year geometric mean test, a 5-year geometric mean TP concentration was then calculated by computing the geometric mean of the 5 annual TP levels within the 5-year period.
7. The resulting long-term annual and 5-year geometric mean TP concentrations were compared to Florida's Phosphorus Water Quality Standard for the Everglades.

Class III Phosphorus Standard

➤ **Florida's Everglades Phosphorus WQ standard has 4-part assessment:**

Part 1: 5-year geometric mean of 10 ppb or less

Part 2: Annual geometric mean of 11 ppb or less

Part 3: Annual geometric mean of 10 ppb or less in 3 of 5 years

Part 4: Individual station annual geometric mean of 15 ppb or less

Compliance if all 4 parts are met

Results of Long-Term Level Calculations

Water Year*	Consent Decree Long-Term Levels based on measured daily stage from WY1999 - WY2006	
	Annual Geomean of Monthly Levels (1)	5-year Geomean of Monthly Levels (2)
WY1999	10.6	
WY2000	9.6	
WY2001	12.0	
WY2002	9.8	
WY2003	10.2	10.4
WY2004	9.6	10.2
WY2005	11.5	10.6
WY2006	10.9	10.4
Average	10.5	10.4

* Water Year = May 1 - April 30

Phosphorus concentrations expressed in parts per billion (ppb)

Comparison of Class III with Long-Term Levels for the Refuge

Comparison of Consent Decree with Class III Criteria (4-part test) Based on 1999-2006 Data

Component of 4-Part Test	Consent Decree	Class III Criteria	Lower/More Protective
Part 1: 5-year geometric mean of 10 ppb or less	10.2-10.5 ppb (10.4 ppb avg)	10.0 ppb	Class III
Part 2: Annual geometric mean of 11 ppb or less	9.5-12.0 ppb (10.5 ppb avg)	11 ppb limit (Part 2) and	
Part 3: Annual geometric mean of 10 ppb or less in 3 of 5 years	(two years above the 11 ppb Class III Max.)	3/5 years below 10 ppb (Part 3) (max average =10.4 ppb)	
Part 4: Individual station annual geometric mean of 15 ppb or less	Consent Decree does not assess individual sites.	Class III criteria specifies a 15 ppb limit for individual sites.	

Other Factors to Consider

Compliance with the Consent Decree algorithm is evaluated using a 14 site network. Compliance with the Class III criteria is evaluated using 17 sites (14 Consent Decree sites + 3 additional sites near transitional areas) in the unimpacted area and 7 sites in the impacted area, with impacted and unimpacted sites to be evaluated separately.

Class III criteria derived based on biological response not dependent on water level management. Under the WY1999-WY2006 stage conditions in the Refuge, the algorithm of the Consent Decree allows 5-year geometric means above 10 ppb during each period.

Results

- Analysis indicates that the Class III total phosphorus concentration levels are lower than the long-term total phosphorus concentration levels of Appendix B.